Claims:

1. A method of preparing a surface for electrochemical deposition, comprising:

depositing a barrier layer comprising tantalum using high density plasma physical vapor deposition over the surface to form a high conductance barrier layer having a resistivity of less than about 160 μΩ-cm; and

depositing a seed layer over the barrier layer.

2. The method of claim 1, wherein the barrier layer is deposited at a substrate temperature between about 350°C and about 600°C.

3. The method of claim 1, wherein depositing the barrier layer comprises providing a processing pressure between about 20mTorr and about 100 mTorr.

4. The method of claim 1, wherein the barrier layer is deposited at a substrate temperature between about 350°C and about 600°C and at a processing pressure between about 20mTorr and about 100 mTorr.

5. The method of claim 1, wherein the seed layer comprises a copper seed layer.

6. A method of forming a high conductance barrier layer, comprising:

depositing a first barrier layer to a thickness between about 50Å and about 250Å over the surface using chemical vapor deposition, wherein the first barrier layer comprises a material selected from the group consisting of titanium nitride, tungsten and tungsten nitride and combinations thereof;

depositing a second barrier layer to a thickness between about 50Å and about 250Å over the first barrier layer using physical vapor deposition, wherein the second barrier layer comprises a material selected from the group consisting of titanium nitride, tantalum and tantalum nitride and combinations thereof; and

wherein the first barrier layer and the second barrier layer form a high conductance barrier layer having a resistivity of less than about 160 μΩ-cm.

7. The method of claim 6, wherein depositing a second barrier comprises depositing the second barrier layer utilizing high density plasma physical vapor deposition.

8. The method of claim 7, wherein the second barrier layer is deposited at a substrate temperature between about 350°C and about 600°C.

9. The method of claim 7, wherein the second barrier layer is deposited at a processing pressure between about 20mTorr and about 100 mTorr.

10. The method of claim 7, wherein the second barrier layer is deposited at a substrate temperature between about 350°C and about 600°C and at a processing pressure between about 20mTorr and about 100 mTorr.

11. A method of preparing a surface for electrochemical deposition, comprising:

forming a high conductance barrier layer having a resistivity of less than about 160 μΩ-cm on the surface; and

depositing a seed layer over the barrier layer utilizing high density plasma physical vapor deposition.

12. The method of claim 11, wherein the seed layer is deposited to a bottom film thickness between about 250Å and about 1,500Å.

13. The method of claim 12, wherein the seed layer is deposited to a sidewall film thickness less than about 250Å.

14. The method of claim 11, wherein the seed layer comprises a copper seed layer.

15. The method of claim 11, wherein the high conductance barrier layer comprises a material selected from the group consisting of tungsten, tungsten nitride, titanium and titanium nitride, and combinations thereof.

16. The method of claim 11, wherein the high conductance barrier layer comprises a multi-layered stack of one or more materials selected from the group consisting of tungsten, tungsten nitride, titanium and titanium nitride, and combinations thereof.

17. The method of claim 11, wherein forming a high conductance barrier layer comprises:

depositing a layer comprising tantalum; and

annealing the layer at a temperature between about 350°C and about 600°C for between about 30 seconds and about 30 minutes.

18. The method of claim 17, wherein annealing the layer comprises annealing the layer at a temperature between about 450°C and about 500°C.

19. The method of claim 11, wherein forming a high conductance barrier layer comprises depositing a layer comprising tantalum at a deposition temperature between about 350°C and about 600°C.

20. The method of claim 11, wherein forming a high conductance barrier layer comprises depositing a layer comprising tantalum utilizing high density plasma physical vapor deposition.

21. The method of claim 20, wherein the layer is deposited at a substrate temperature between about 350°C and about 600°C.

22. The method of claim 20, wherein the layer is deposited at a processing pressure between about 20mTorr and about 100 mTorr.

23. The method of claim 20, wherein the layer is deposited at a substrate temperature between about 350°C and about 600°C and at a processing pressure between about 20mTorr and about 100 mTorr.

24. The method of claim 11, wherein forming a high conductance barrier layer comprises:

forming a first barrier layer over the surface using chemical vapor deposition; and

forming a second barrier layer over the first barrier layer using physical vapor deposition.

25. The method of claim 24, wherein the first barrier layer comprises a material selected from the group consisting of titanium nitride, tungsten, and tungsten nitride and combinations thereof.

26. The method of claim 24, wherein the second barrier layer comprises a material selected from the group consisting of titanium nitride, tantalum, and tantalum nitride and combinations thereof.